Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.-53. (Canceled)

54. (Currently amended) ~~The apparatus of claim 52 comprising~~ An apparatus for analyzing an object, comprising:

a source of non-planar penetrating radiation;

a monochromator for diffracting the non-planar penetrating radiation to provide a beam of monochromatic penetrating radiation, said beam having a direction of propagation;

a detector for detecting the monochromatic penetrating radiation that passes through an object;

an analyzer for diffracting the monochromatic penetrating radiation that passes through the object onto the detector;

means for rotating the analyzer between a plurality of angular positions;

means for recording one or a plurality of intensities of radiation incident on the detector as a function of analyzer position; and

a slit through which the beam of monochromatic penetrating radiation passes prior to incidence of the beam on the object, wherein the slit has a size A in a direction transverse to the direction of propagation of the beam and calculated according to the formula:

$$A \leq \lambda/\delta\theta$$

wherein λ is the wavelength of incident radiation and $\delta\theta$ is optical resolution provided by the apparatus.

55.-70. (Canceled)

71. (Previously presented) An apparatus for analyzing an object, comprising:

a source of penetrating radiation;

a monchromator for diffracting the penetrating radiation to provide a beam of monochromatic penetrating radiation, said beam having a direction of propagation;

a slit member defining a slit through which the beam passes prior to incidence of the beam on the object, wherein the slit has a size *A* in a direction transverse to the direction of propagation of the beam and calculated according to the formula:

$$A \leq \lambda/\delta\theta$$

wherein λ is the wavelength of incident radiation and $\delta\theta$ is optical resolution of the apparatus;

a detector for detecting radiation that passes through the object;

an analyzer for diffracting the radiation that passes through the object onto the detector;

means for rotating the analyzer between a plurality of angular positions; and

means for recording one or a plurality of intensities of radiation incident on the detector as a function of analyzer position.

72. (Previously presented) The apparatus of claim 71, comprising means for determining, from the recorded intensities, a complex scattering function of a portion of the object.

73. (Previously presented) The apparatus of claim 71 wherein the analyzer is rotated in incremental steps α, wherein $\alpha \leq \delta\theta/2$ and $\delta\theta$ is optical resolution provided by the apparatus.

74. (Previously presented) The apparatus of claim 71 wherein the detector comprises a PIN diode detector.

75. (Previously presented) The apparatus of claim 71 wherein the source of radiation is a characteristic line source.

76. (Previously presented) The apparatus of claim 71 wherein the source of radiation is a rotating anode source.

77. (Previously presented) The apparatus of claim 71 comprising means for determining, from the measured intensities, a complex scattering function of the object, wherein said means for determining a complex scattering function comprises (i) means for calculating, from the recorded intensities, a complex scattering amplitude of an irradiated portion of the object; and (ii) means for determining from said complex scattering amplitude an inverse Fourier Transform to obtain a complex scattering function.

78. (Previously presented) The apparatus of claim 77, comprising:

means for normalizing the measured intensities;

means for calculating a modulus of the complex scattering amplitude form the normalized intensities;

means for calculating, from said modulus, phase information for the complex scattering amplitude; and

means for determining, from said modulus and phase information, the complex scattering amplitude.

79.-81. (Canceled)